in the XPC treatment compared with the NC, while both XPC and NC revealed ST to be below the limit of detection at the 48 h time point in both the 14 and 42 d samples. The microbiome analysis indicated a significant increase in species diversity and richness directly related to age, revealing the importance of cecal microbiome maturity. The results from the current study indicate the effect of maturity on the cecal microbiome in the reduction of ST and XPC may accelerate the time it takes to reach mature levels. The XPC F control suggests XPC works in concert with the cecal microbiome in the reduction of ST.

Key Words: poultry, XPC, cecal microbiome, in vitro, sequencing

443P A comparative analysis of microbial profile of chicken and guinea fowl using a metagenomic approach. Sarayu Bhogoju*[SC], Samuel Nahashon, and Joseph Donkor, *Department of Agricultural and Environmental Sciences, Tennessee State University, Nashville, TN.*

Probiotics are live microbials that confer beneficial effects such as promoting growth and health to the host; however, their mode of action is obscure. Differences may also exist in microbial profiles among avian species, requiring development of species-specific probiotics. The objective of this research was to characterize microbial profiles of the chicken and guinea fowl (GF) using the metagenomics approach. Amplification of the hypervariable region encoding the 9 variable regions (V1-V9) of the 16s rRNA genes was used to distinguish gastrointestinal tract (GIT) microbials. Ten chickens and 10 GF raised under standard broiler management conditions for 5 mo were killed by cervical dislocation and GIT contents were collected. DNA was extracted from GIT contents using the Purelink genomic DNA extraction kit. The 16s DNA library was constructed using 16s metagenomics kit and sequencing template was prepared using IonOneTouch-2 system following instructions from ion PGM Template OT2 400 kit (Life Technologies). The template enrichment process was conducted using Ion one Touch ES system. The enriched samples were amplified, loaded onto 316V2 chip and sequenced using the Ion PGM system following instructions from Ion PGM 400 sequencing kit. The sequencing data were analyzed using Ion reporter software based on Core QIIME pipeline with GreenGenes and Microseq ID databases for phylogenetic diversity. Microbial profile of chicken and GF revealed taxonomic diversity of these avian species consisting of almost 150 families. Chicken microbial profile showed abundance of microbial species than GF. Phylum *Firmicutes* was most abundant in both the avian species, whereas phylum *Actinobacteria* was most abundant in chickens than GF. The microbial profile of chicken and GF revealed diverse probiotic bacteria whose distribution will be correlated with performance characteristics in attempt to improve poultry growth and production performance.

Key Words: probiotics, metagenomics, poultry performance, chicken, guinea fowl

444P Noni (*Morinda citrifolin*) modulates the hypothalamic expression of feeding-related neuropeptides and heat shock proteins in broilers exposed to acute heat stress. Hossein Rajaei-Sharifabadi[1], Elizabeth Greene[1], Kentu Lassiter[1], Alissa Piekarski[1], Devin Cook[1], Kaley Blankenship[1], Phong Nguyen[1], Austin Decker[1], Lukas Gramlich[1], Yvonne V. Thaxton[1], Yi Liang[2], Laura Ellestad[3], Tom E. Porter[3], Walter G. Bottje[1], Sami Dridi*[1], *[1]Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, AR, [2]Department of Biological and Agricultural Engineering, University of Arkansas, Fayetteville, AR, [3]Department of Animal and Avian Sciences, University of Maryland, College Park, MD.*

The tropical Noni plant (*Morinda citrifolin*) is used in tropical conditions to improve broiler performance during heat stress, but mechanisms of action are not known. The major goal of this study was to determine the effect of Noni on feed intake (FI), feeding behavior, and expression of hypothalamic peptides and stress-related genes in broilers during an acute heat stress (HS). Broilers (480 males, 1 d old) were randomly assigned to 12 environmental chambers; each divided into 2 pens (12 × 4 ft) with separate feeders and water lines. Chicks (20 per pen) were fed a corn-soy based starter diet (Control) or one containing 2 g dried Noni plant/kg feed (Noni) and brooded under thermoneutral conditions for 21 d. On d 22, temperature was increased to 35 C in 8 chambers to induce acute heat stress (HS) with the remaining 4 chambers maintained at 25°C. Feeding behavior was recorded and analyzed using video cameras and FI determined over the 2-h acute HS period. Randomly selected broilers (1/pen) equipped with temperature recording thermistors, were humanely killed (cervical dislocation) and hypothalamic samples flash frozen in liquid nitrogen for subsequent gene and protein expression analysis. Body temperature recordings were downloaded from the thermistors retrieved from their final location in the ventriculus. Data were analyzed by 2-way ANOVA and Duncan's multiple range test used to assess significance. Acute HS increased body temperature and reduced FI with heat stressed birds spending more time lying down and less time eating compared with TN birds. There were no dietary effects on body temperature, FI, or feeding behavior during the acute HS. Heat-induced elevations of expression of heat shock protein 90 (HSP90) and related transcription heat shock factors (HSF1 and HSF4) in the hypothalamus of Controls were attenuated in Noni-fed broilers. The expression of hypothalamic orexigenic neuropeptide NPY and AgRP as well as the phosphorylated levels of AMPKa1 (at Thr172 site), were decreased by HS and these HS-induced changes were accentuated in the Noni group. Together our data indicate that diet-containing 0.2% Noni modulates the hypothalamic expression of neuropeptides, AMPK and stress-related genes without affecting FI in broilers exposed to acute HS.

Key Words: heat stress, feeding behavior, hypothalamus, neuropeptide, heat shock protein

445P Influence of dietary Na-butyrate, initial BW, and beak trimming on BW uniformity and growth performance of brown-egg laying pullets from hatching to 42 d of age. Beatrix Saldaña[1], Pilar Guzmán[1], Guillermo Fondevila[1], Andrés Ortiz[2], Raúl Rodríguez[3], and Gonzalo G. Mateos*[1], *[1]Departamento de Producción Agraria, Universidad Politécnica de Madrid, Madrid, Spain, [2]Nutega S. L., Madrid, Spain, [3]Ibertec S. A. U., Valladolid, Spain.*

The influence of initial BW of the pullets and beak trimming on growth performance and BW uniformity was studied in Lohmann Brown pullets fed diets supplemented or not with Na-butyrate (Butirex C4; Novation 2002 S. L.) from hatching to 42 d of age. Treatments formed a 2 × 3 × 2 factorial with 2 initial BW of the pullets (34.2 vs. 37.9 g), 3 models of beak trimming (L-0 and H-0; low or high infrared intensity immediately after hatching and F-8; traditional trimming at 8 d of age at the farm), and 2 levels of Na-butyrate (0 vs. 0.3%). No interactions among main effects were detected for any of the variables studied. From 0 to 14 d of age pullets that were heavier at hatching had greater BW than pullets that were lighter but the difference disappeared with age. BW uniformity at 42 d of age was not affected by treatment but at 7 d of age, it was better in F-8 pullets than in L-0 and H-0 pullets ($P < 0.001$). From 0 to 7 d of age, F-8 pullets had greater ADFI ($P < 0.01$) and ADG ($P < 0.001$) than L-0 and H-0 pullets but an opposite effect was observed from 7 to 14 d of age. This interaction between performance and age was expected because of the stress caused by beak trimming of the F-8 birds at 8 d of

age. Cumulatively, H-0 pullets had greater ADFI ($P < 0.01$) than F-8 pullets, with L-0 pullets being intermediate. However, no differences in ADG or FCR were detected. In general, the inclusion of Na-butyrate increased ADG and improved FCR in all periods considered but the differences were significant only for ADG from 0 to 14 d of age (5.20 vs. 5.03 g; $P < 0.05$). In summary, within the range of BW studied, the initial BW of the birds did not affect pullet performance. Beak trimming did not affect ADG or FCR of the pullets from 0 to 42 d of age. Na-butyrate improved pullet performance significantly from 0 to 2 wk of age but no effects were observed thereafter.

Key Words: beak trimming, initial body weight, pullet, Na-butyrate, uniformity

446P Performance and intestinal microbial profile of broiler chickens supplemented with a blend of protected organic acids and essential oils. Glenmer B. Tactacan*, Kathleen Sary, Wayne Bradshaw, and Derek Detzler, *Jefo Nutrition, Saint-Hyacinthe, QC, Canada.*

The increasing concern about the use of antibiotics in poultry production has changed the ways in which producers manage the birds' overall health. Currently, additives with anti-microbial and growth promoting effects are added in poultry feeds to prevent and control GI-tract infections that adversely affect performance. A study was conducted to determine the effects of a blend of protected organic acids (OAs) and essential oils (EOs) in performance and intestinal microbial profile of broiler chickens. A total of 612 Ross 308 d old chicks were randomly assigned to receive 1 of 3 treatments for 28 d: 1) basal diet with no antibiotic + 100 ppm lasalocid (T1) (n = 204), 2) T1 + 300 ppm of protected OAs and EOs (T2) (n = 204), and 3) T1 + 1500 ppm of protected OAs and EOs (T3) (n = 204). A completely randomized design with 3 treatments, 12 replicates, and 17 birds in each replicate was used. On d 14 and 28, 1 bird from each pen was killed to collect ileal and cecal samples for microflora analysis using high-throughput sequencing based on 16S rRNA genes. The BW of birds in T2 and T3 at d 21 was significantly increased relative to T1 ($P < 0.02$, 4.6%), as was the BW of birds in T2 at d 28 ($P < 0.05$, 2%). The FCR was not different between treatments; however, there was a trend toward improved FCR at d 21 in T2 ($P < 0.09$, 5.5%) and T3 ($P < 0.06$, 5.6%), as well as at d 28 in T2 ($P < 0.06$, 5.7%). Sequencing data at d 14 and 28 revealed retained complexity and overall structure of the ileal and cecal microbiota across treatments. However, the intestinal microbial profile of treatments changed in between these time points. Compared with T1, significant changes in the abundance of some *Lactobacillus* species within the cecum of birds in T2 and T3 were found at d 28. Overall, supplementation of a blend of protected OAs and EOs had no adverse effect on the microbial diversity of the intestine and appeared to offer benefits with respect to gut health and productivity in broiler chickens.

Key Words: organic acid, essential oil, performance, microflora, broiler

447P Aflatoxin contamination and the use of a specific bentonite alter plasma parameters in ducklings: Multiple trial analyses. Clementine Oguey*[1] and Gaëlle Benzoni[2], [1]*Pancosma SA, Le Grand Saconnex, Geneva, Switzerland,* [2]*InVivo NSA, Saint Nolff, France.*

The objective of the study was to assess first the effect of aflatoxin contamination (AFLA), the effect of anti-mycotoxin additives and finally the influence of the inclusion dose of a specific bentonite (MY, MyT, Pancosma) on total plasmatic protein of ducklings. A first set of data regrouped 6 trials organized in 18 studies (673 d-old Pekin ducks; mean duration = 15.4 d). All trials reported side by side comparisons of a mycotoxin-free feed with a diet containing synthetic AFLA (20 to 370 ppb). A second set of data regrouped 24 comparisons organized in 15 studies, all reporting side by side comparisons of the use of anti-mycotoxins additives (mainly binders) vs. non contaminated and AFLA diets (2,066 day-old Pekin ducks; mean duration = 14 d, mean AFLA = 74 ppb). The last database regrouped 31 comparisons organized in 8 studies and assessed the effect of MY dose in AFLA contaminated birds (508 day-old Pekin ducks; mean duration = 14 d, mean AFLA = 91 ppb). The selected outcome was the level in total plasmatic protein (TPP). For each set of data, data were analyzed using a mixed model with the TRIAL variable as a random effect. AFLA was considered as a fixed effect in the first set of data. Treatment was set as a fixed effect in the second and third sets of data. Mean values were calculated using the LSMEANS procedure, weighting the data for the variance among trials. AFLA level linearly decreased TPP ($P < 0.001$). This confirmed the validity of this model to assess the intensity of AFLA on animals. Among the 17 anti-mycotoxins additives tested, MY exhibited one of the strongest effect on TPP in ducklings fed AFLA contaminated diet via an increase of TPP by 21.9% ($P < 0.02$) compared with contaminated control and enabled to reach the same similar values as AFLA-free control ($P > 0.07$). Finally, MY increased TPP of birds fed an AFLA contaminated diet in a dose dependent manner. An inclusion level of 3 kg/t MY or higher enabled to reach TPP not different from birds fed a non-contaminated diet. These findings confirm the potential of MY to limit the negative effects of AFLA contamination on animals.

Key Words: aflatoxin, in vivo model, multiple analysis, toxin binder

448P Evaluation of productive parameters of broilers supplemented with cyproheptadine hydrochloride in a corn-soy based diet. Neshan W. Sarkisian[1,2], Valentino Arnaiz*[1], and Pedro Shiomura[1], [1]*Montana S.A., Lima, Perú,* [2]*Universidad Científica del Sur, Lima, Perú.*

A group of 450 male Cobb 500 broilers were subjected to varying concentrations of an appetite stimulant containing cyproheptadine hydrochloride 0.5% in a corn-soy based diet to evaluate its efficacy by comparing weight gain (WG), feed conversion ratio (FCR), and feed consumption (FC). The broilers were divided into 3 treatment groups in a completely randomized design (CRD); the treatments were control diet, 5ppm (control + 5ppm of cyproheptadine hydrochloride) and 10ppm (control + 10ppm of cyproheptadine hydrochloride). Each treatment had 3 replications, and each replication had 50 broilers, giving a total of 450 broilers for all the trial. The parameters of WG, FC, and FCR were measured on a weekly basis. All data was analyzed using a one-way ANOVA ($\alpha = 0.05$); data was further evaluated post hoc with Duncan's multiple range test. Groups supplemented with cyproheptadine hydrochloride reached superior values in every parameter when compared with the control: WG: control = 2831.1 g, 5ppm treatment = 2989.2 g and 10ppm treatment = 3022.7 g; FC: control = 4683.2 g, 5ppm treatment = 4745.2 g and 10ppm treatment = 4832.7 g; and FCR: control = 1.66, 5ppm treatment = 1.59, 10ppm treatment = 1.60. The 10ppm treatment had the higher WG result (3022.7 g) but did not differed statistically from the 5ppm treatment (2989.2 g); however, they both had significant differences with control (2831.1 g). The 10ppm treatment (4832.7 g) FC was higher than 5ppm treatment (4745.2 g), and the 5ppm treatment FC was higher than control (4683.2g); all 3 showed significant differences between each other. The FCR results showed no statistically differences between the 5ppm (1.59) and 10ppm (1.60) treatments but they both had significant differences with control (1.66). Based on the